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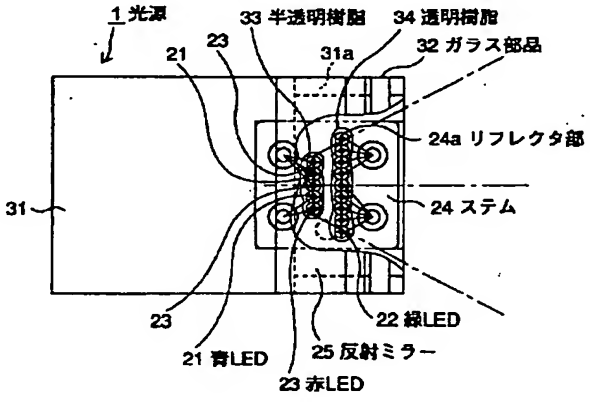
(54)【発明の名称】　画像入力装置及び発光装置

(57)【要約】

【目的】　照明光の光量の確保と照明波形の均一化を両立させる。

【構成】　光量が少なく個数の多い緑のＬＥＤ２２を拡散性のない透明樹脂３４で封止し、光量が多く個数の少ない赤のＬＥＤ２３及び青のＬＥＤ２１を拡散性のある半透明樹脂３３で封止する。



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【特許請求の範囲】

【請求項1】　複数色の発光素子から発する光を原稿の画像に照射し、前記原稿からの光を受光素子により電気信号に変換する画像入力装置において、

前記発光素子の発光面をそれぞれ異なる光拡散性を有する透明封止材で封止したことを特徴とする画像入力装置。

【請求項2】　前記透明封止材の光拡散性は、各色の前記発光素子の発する光の光量により異なることを特徴とする請求項1に記載の画像入力装置。

【請求項3】　前記透明封止材の光拡散性は、各色の前記発光素子の位置により異なることを特徴とする請求項1に記載の画像入力装置。

【請求項4】　原稿の画像を光電変換素子により読み取るために、前記原稿に対して第1色と、前記第1色とは異なる第2色の光を発する発光装置において、

ステム上に配置され、前記第1色を発光する第1発光素子と、

前記ステム上に前記第1発光素子と並列に配列され、前記第2色を発光する第2発光素子と、

前記第1発光素子を封止する第1拡散性を有する第1透明封止材と、

前記第2発光素子を封止する前記第1拡散性とは異なる第2拡散性を有する第2透明封止材とを備えることを特徴とする発光装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、原稿の画像を入力して電気信号に変換する画像入力装置及びそれに用いられる発光装置に係り、特に、光源から発する光の光量の確保と、照明波形の均一化を両立することのできる画像入力装置及び光源装置に関する。

【0002】

【従来の技術】図8乃至図12に従来の画像入力装置の一例の構成を示す。図8及び図9において、画像入力装置は、光源1から発する照明光を原稿2上に導く照明部3と、原稿2を保持して移動するキャリッジ4と、原稿2を透過する透過光を撮像素子であるラインセンサ（CCD）5上に結像する投影部6とから構成されている。

【0003】照明部3は、板状のベース部材7上に、放射状に光を発する光源1と、光の向きを変え、原稿面上で線状になるようにする第1ミラー8、第2ミラー9が取り付けられてなっている。さらに、光源1、第1ミラー8、第2ミラー9を覆うように配置されるとともに、照明光の透過するスリット10を有する照明部蓋部材11が、ベース部材7に、爪状の引っかけ部11aによって固定されている。光源1から発せられた光は、第1ミラー8により原稿面上で線状になるように集光され、第2ミラー9により原稿方向、すなわち垂直方向へ曲げられる。

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【0004】従って、第2ミラー9からの光が、蓋部材11のスリット10を通過する付近では、細長い略長方形の形状となる。蓋部材11に設けられるスリット10は、照明光が通過するのに必要な大きさがあればよいので、光の形状よりやや大きい程度の長方形状になっている。また、スリット10の一部は、内側に板11bが曲げられており、ベース部材7の前面に設けられた開口部12からの外光が、スリット10を通って光源1に到達するのを防いでいる。

【0005】第1ミラー8としてはトーリックミラーを用いている。トーリックミラー8は図10に示すように原稿面2aに対して平行の方向の第1の曲率を有する曲面R1と、原稿面2aに対して直角の方向の第2の曲率を有する曲面R2とが複合されて形成されている。そして曲面R1により光源1から放射される光1aを原稿面2aの位置において読取り1ライン分の幅を照明するようにしており、また曲面R2により光源1の光源像を原稿面2a上に結像させている。

【0006】原稿2を挟んで保持する上キャリッジ4aと、下キャリッジ4bとは、平行に配置された2本のガイドバー13に案内され、左右方向に移動可能である。上キャリッジ4aの一部には、図示しないラック部が設けられており、これと図示しないステッピングモータ等により駆動されるピニオンにより、キャリッジ4が左右に移動する。

【0007】投影部6は、第3ミラー14、レンズ15、CCD5と、全体を覆うと同時に原稿透過光の通過するスリット16の設けられた投影部蓋部材17から構成されている。また、投影部蓋部材17のスリット16も、照明部蓋部材11と同様に、板17aが内側に曲げられており、開口部12からの外光が、スリット16を通って直接投影部6の内側に侵入するのを防いでいる。また、照明部蓋部材11、投影部蓋部材17ともに、それ自身外光を反射しないよう、表面は黒色で艶消し処理がなされている。そして照明部3によって照明された原稿2の画情報は、第3ミラー14により反射しレンズ15によりCCD5に結像する。

【0008】図11および図12に光源1の構成を示す。光源1は、6個の発光素子としての青（B）のLED21、4個の緑（G）のLED22および2個の赤（R）のLED23を有しており、各LED21、22、23は、ステム24に実装されている。また、6個の青のLED21は、一直線上に配列され、緑のLED22および赤のLED23は、平行の一直線上にGRGGRGの順に配列されている。そして、各LED21，22，23から発し、光源1に設けられた反射ミラー25の両面により反射した光の光軸は、同一平面上に位置している。

【0009】12個のLED21，22，23は、導電性材料で板状に形成されたステム24に実装されてお

り、各ＬＥＤ２１，２２，２３の一極はステム２４に接続されている。また各ＬＥＤ２１，２２，２３の他極は、ステム２４にそれぞれ絶縁部材２６を介して装着された電極２７に、ワイヤ２８を介して接続されている。さらに各ＬＥＤ２１，２２，２３の周囲のステム２４には、横方向への発光を反射して上方へ射出する円錐状のリフレクタ部２４ａが形成されている。各リフレクタ部２４ａで反射した光は、反射ミラー２５で反射して前方へ射出され、さらにミラー８，９により原稿２上で線状になるように集光される。

【００１０】このとき、青のＬＥＤ２１から発した光は、反射ミラー２５の第１面に形成された青反射膜２５ａで反射し、緑のＬＥＤ２２及び赤のＬＥＤ２３から発した光は、反射ミラー２５の第２面に形成された全反射膜２５ｂで反射する。この結果、光源１の前方から見たときに、３色があたかも同一の位置から発光しているように見える。また青、緑、赤の３色の切り替えを電気的に制御することで、原稿２を高速に読み取ることができる。なお、図１２に示す符号２９は、反射ミラー２５の出光面に設けられた４５度プリズムであり、４５度プリズム２９の出光面には赤外カット膜３０が形成されている。

【００１１】

【発明が解決しようとする課題】一般にＬＥＤチップ１個から原稿面上の細長い範囲を照明したときの照明波形は、図１３に示すように主走査方向の光の強度分布に細かい強弱があり、不均一な波形となっている。この結果、いわゆる照明ムラが大きくなったり、あるいは読み取った画像上に細いスジが現われてしまうことがあった。

【００１２】この問題を解決するためにＬＥＤの数を増やして同時に点灯すると、それぞれのＬＥＤから発した光が重ね合わされるために、図１４に示すように波形が適当に相殺されて、最終的な原稿面上での照明光はほぼ均一となる。従って赤、緑、青のどの色についてもＬＥＤの数を増やすことにより照明ムラを小さくして均一に照明することができる。

【００１３】しかしながら実際にはステム２４上に搭載できるＬＥＤの数には制限があるので、全ての色について多数のＬＥＤを搭載することはできない。通常は光量のバランスを考慮して１個のＬＥＤあたりの光量が少ない色のＬＥＤ、例えば図１１に示す従来例では青のＬＥＤ２１を多く配置するので、明るい色のＬＥＤ、例えば緑のＬＥＤ２２及び赤のＬＥＤ２３の数を多くすることができず、前述したような問題を生ずる。また安易にＬＥＤの数を増やすことはコスト高を招き好ましくない。

【００１４】一方、光源１またはそれ以外の照明系の光学部品に光拡散性をもたせれば、照明光の波形を均一にすることが可能となる。しかしながらこの場合には、全ての色の光について拡散させるため、光量が総合的には

少なくなってしまい、読み取り速度が遅くなるという問題がある。特に１個あたりの光量が少ない色のＬＥＤについては、数を増やして光量を多くし、波形も均一になっているものをわざわざ拡散させることになり、無駄が多い構成になってしまう。

【００１５】すなわち、１個あたりの光量の多い色のＬＥＤについては、多少光量を落としても拡散により照明光を均一化するのが好ましく、逆に光量の少ない色についてはＬＥＤの個数を増やして光量の増加と波形の均一化を図り、拡散させないほうが好ましい。しかし従来はこれらを同時に実現することができなかったため、拡散せずに光量を確保しようとすれば照明ムラやスジが発生してしまい、逆に拡散して波形の均一化を図れば総合的な光量が低下して、読み取り速度が遅くなるという問題があった。

【００１６】本発明はこのような状況に鑑みてなされたもので、照明光の光量の確保と照明波形の均一化とを両立することのできる画像入力装置及び発光装置を提供することを目的とする。

【００１７】

【課題を解決するための手段】上記目的を達成するために、請求項１に記載の画像入力装置は、複数色の発光素子（例えば図１のＬＥＤ２１，２２，２３）から発する光を原稿（例えば図８の原稿２）の画像に照射し、原稿２からの光を受光素子（例えば図８のＣＣＤ５）により電気信号に変換する画像入力装置において、ＬＥＤ２１，２２，２３の発光面をそれぞれ異なる光拡散性を有する透明封止材（例えば図１の透明樹脂３４、半透明樹脂３３）で封止したことを特徴とする。

【００１８】請求項２に記載の画像入力装置は、透明封止材３３、３４の光拡散性は、各色のＬＥＤ２１，２２，２３の発する光の光量により異なることを特徴とする。

【００１９】請求項３に記載の画像入力装置は、透明封止材３３、３４の光拡散性は、各色のＬＥＤ２１，２２，２３の位置により異なることを特徴とする。

【００２０】請求項４に記載の発光装置は、原稿２を光電変換素子（例えば図８のＣＣＤ５）により読み取るために、原稿２に対して第１色（例えば図１の緑）と、緑とは異なる第２色（例えば図１の青、赤）の光を発する発光装置（例えば図１の光源１）において、ステム２４上に配置され、緑の光を発光する第１発光素子（例えば図１のＬＥＤ２２）と、ステム２４上にＬＥＤ２２と並列に配列され、青、赤の光を発光する第２発光素子（例えば図１のＬＥＤ２１，２３）と、ＬＥＤ２２を封止する第１拡散性を有する第１透明封止材（例えば図１の透明樹脂３４）と、ＬＥＤ２１，２３を封止する第１拡散性とは異なる第２拡散性を有する第２透明封止材（例えば図１の半透明樹脂３３）とを備えることを特徴とする。

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【0021】

【作用】請求項1、2に記載の画像入力装置においては、1個あたりの発光する光量の多い赤のＬＥＤ２３及び青のＬＥＤ２１の発光面を拡散性を有する半透明樹脂３３で封止することにより、照明波形をほぼ均一にすることができる。このとき赤のＬＥＤ２３及び青のＬＥＤ２１は1個あたりの光量が多いので、拡散による光量の減少分を見越して個数や駆動電流値を調整することにより、必要な光量を確保することができる。

【0022】一方、1個あたりの発光する光量の少ない緑のＬＥＤ２２は、個数を多くすることにより光量の増加と照明波形の均一化を図ることができる。このとき緑のＬＥＤ２２の発光面は透明樹脂３４で封止されているので、封止剤による光量の減少を防ぐことができる。

【0023】請求項3に記載の画像入力装置においては、一直線上に配列されたＬＥＤのうち中央寄りのＬＥＤから発する光がＣＣＤ５に到達する光量は、周辺のＬＥＤから発する光がＣＣＤ５に到達する光量より比較的多いので、同じ色でも中央寄りのＬＥＤを光拡散性の大きい半透明樹脂３３で封止し、周辺のＬＥＤを光拡散性の小さい透明樹脂３４で封止することにより、光量分布の均一化を図ることができる。

【0024】請求項4に記載の発光装置においては、請求項1に記載の画像入力装置に用いられた光源1と同様の構成とすることにより、同様の作用及び効果を得ることができ、発光装置の照明光の光量の確保と照明波形の均一化とを両立させることができる。

【0025】

【実施例】以下、本発明の画像入力装置及び発光装置の一実施例を図面を参照して説明する。

【0026】図1乃至図3に本発明の第1の実施例の構成を示す。これらの図において、図11および図12に示す従来例の部分と対応する部分には同一の符号を付してあり、その説明は適宜省略する。本実施例の特徴は発光装置である光源1の構成にあり、光源1を備える画像入力装置の他の部分の構成は、図8及び図9に示す従来例と同様である。なお、従来例では青のＬＥＤ２１の光量が最も少ない場合について説明したが、本実施例では、緑のＬＥＤ２２の光量が最も少ないものとして説明する。

【0027】図1乃至図3において、光源1内のステム２４上には、ＬＥＤチップがボンディングされる複数個のリフレクタ部２４ａが2列に形成されており、片方の列には比較的光量の多い赤（R）のＬＥＤ２３と青（B）のＬＥＤ２１とがＲＢＲＢの順に配置されている。もう一方の列には3色中最も光量の少ない緑（G）のＬＥＤ２２が複数個、例えば9個一列に配置されている。

【0028】ステム２４が配置された部分のベース部材３１の両側には、三角形状のミラー支持部３１ａが一体

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に形成されている。ミラー支持部３１ａの斜面はステム２４の上面に対して４５度の角度となっており、この斜面には反射ミラー２５の両端が接着固定されている。反射ミラー２５は両面が平行な平板ガラスで構成されており、内側の面には緑反射膜２５ｃが形成され、外側の面には全反射膜２５ｂが形成されている。この構成により緑のＬＥＤ２２から発した光は緑反射膜２５ｃで反射され、赤のＬＥＤ２３及び青のＬＥＤ２１から発した光は緑反射膜２５ｃの表面で屈折して反射ミラー２５内に入り、外側の面の全反射膜２５ｂで反射し、再び緑反射膜２５ｃの面で屈折して射出される。この結果、従来例の場合と同様に、赤／青の列と緑の列との光軸が一致し、光源1の前方から見たときに、3色があたかも同一の位置から発光しているように見える。

【0029】また、光源1の出射方向の前面には、赤外カット膜３０が形成されたガラス部品３２が、出射光の光軸に対して直角方向に光源ベース３１に固定されていて、発光成分中に含まれる赤外成分のみをカットしている。これにより、原稿面上へ導かれる照明光は可視光成分のみとなり、赤外成分が含まれないので、正確な色再現が可能になる。

【0030】ＬＥＤ２１，２２，２３はステム２４内のリフレクタ部２４ａにボンディングされたあと、防塵、固定のためにシリコンなどの樹脂で封止される。このとき赤のＬＥＤ２３及び青のＬＥＤ２１の列には拡散性を有する半透明樹脂３３を用いて封止しており、緑のＬＥＤ２２の列には拡散性のない透明樹脂３４を用いて封止している。

【0031】上記の構成によると、赤のＬＥＤ２３及び青のＬＥＤ２１から発する光はＬＥＤ２３，２１から出た直後に半透明樹脂３３により拡散され、照明波形の均一化を図ることができる。このとき拡散のため光量は低減するが、赤のＬＥＤ２３及び青のＬＥＤ２１は1個あたりの光量が多いので、拡散により光量が減少する分を見越して、個数や駆動電流値を調整することで対応できる。

【0032】一方、緑のＬＥＤ２２は通常の透明樹脂３４で封止されており、拡散されないので光量が落ちることはない。またＬＥＤ２２は9個と数が多いので、照明波形が相殺されフラットな照明光となる。

【0033】すなわち、光量には余裕があるが個数が少なく、照明光が波形となる赤のＬＥＤ２３及び青のＬＥＤ２１から発する光のみを選択的に拡散させ、光量の少ない緑のＬＥＤ２２については個数を多くして光量の増加と照明波形の均一化を図ることができる。この結果、拡散させない場合と比較して照明ムラの少ないフラットな波形を得ることができる。また拡散手段により全ての光を拡散させた場合と比較すれば、光量の少ない色のＬＥＤについて無駄な拡散を行なうことがないので、総合光量を低下させることがない。

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【００３４】本実施例によれば、３色ともほぼ均一な光の強度分布を有し、かつ光量も確保された照明光を得ることができるので、高品質かつ高速に画像を読み取ることが可能になる。

【００３５】図４及び図５に本発明の第２の実施例の構成を示す。本実施例は図１１及び図１２に示す従来例と同様に、反射ミラー２５を三角プリズム２９に接合した場合であり、ＬＥＤ２１，２２，２３の透明封止材による封止構造は、前述の実施例の構造と同様であり、効果も同様である。

【００３６】上記各実施例ではＬＥＤ２１，２２，２３を２列に配置した場合について説明したが、図６に示すように１列に配置してもよい。このとき例えばＧ、Ｇ、Ｂ、Ｒ、Ｂ、Ｇ、Ｇの順に配置し、緑（Ｇ）のＬＥＤ２２を透明樹脂３４で封止し、赤（Ｒ）のＬＥＤ２３及び青のＬＥＤ２１を半透明樹脂３３で封止してもよい。このとき中心のＬＥＤ（Ｒ）２３から発する光がＣＣＤ５に到達する光量は周辺のＬＥＤ（Ｂ）２１及びＬＥＤ（Ｇ）２２から発する光がＣＣＤ５に到達する光量より多いので、中心のＬＥＤ（Ｒ）２３を封止する半透明樹脂３３の拡散性を最も大きくする。

【００３７】また図７に示すように、ステム２４を光源ベース３１上に垂直に配置し、ステム２４の表面に図６に示すようにＬＥＤ２１，２２，２３を１列に配置して、反射ミラー２５を省略してもよい。

【００３８】上記各実施例では、緑のＬＥＤ２２が最も光量が少ない場合について説明したが、本発明はこれに限定されるものでなく、複数色の光源を用いるときに、光量の少ない色のＬＥＤから発する光を拡散性のない透明樹脂３４を介して出光し、光量の多い色のＬＥＤから発する光を拡散性の半透明樹脂３３で選択的に拡散させることで、同様の効果が得られることが言うまでもない。またＬＥＤの光量に応じて樹脂の拡散性に差を設けてもよい。

【００３９】

【発明の効果】以上説明したように、本発明の画像入力装置及び発光装置によれば、発光素子の発光面を、発光

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素子の発する光の光量や位置に応じて異なる光拡散性を有する透明封止材で封止したので、照明光の光量の確保と照明波形の均一化とを同時に図ることができる。

【図面の簡単な説明】

【図１】本発明の画像入力装置の第１の実施例による発光装置としての光源の構成を示す一部破断平面図である。

【図２】図１の縦断面図である。

【図３】図２のＬＥＤ部の構成を示す拡大縦断面図である。

【図４】本発明の第２の実施例による光源の構成を示す一部破断平面図である。

【図５】図４の縦断面図である。

【図６】本発明の他の実施例によるＬＥＤの配置を示す平面図である。

【図７】本発明の他の実施例による光源の構成を示す側面図である。

【図８】従来の画像入力装置の一例の構成を示す一部破断側面図である

【図９】図８の照明部及び投影部の構成を示す分解斜視図である。

【図１０】図９の光学系を示す示す説明図である。

【図１１】図８の光源の構成を示す一部破断平面図である。

【図１２】図１１の縦断面図である。

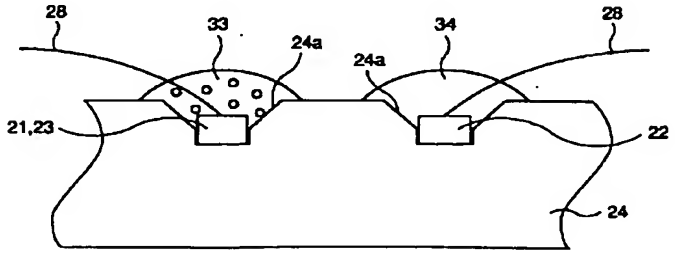
【図１３】拡散させない場合のＬＥＤ１個の照明波形の一例を示す線図である。

【図１４】均一化された照明波形の一例を示す線図である。

【符号の説明】

１　光源（発光装置）
２　原稿
５　ＣＣＤ（受光素子）
２１，２２，２３　ＬＥＤ（発光素子）
３３　半透明樹脂（透明封止材）
３４　透明樹脂（透明封止材）

【図３】



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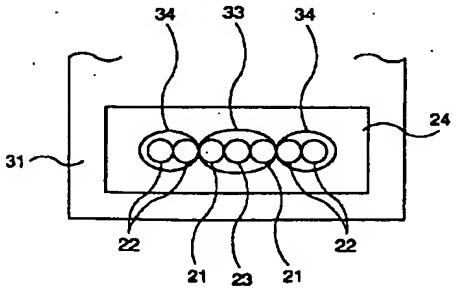

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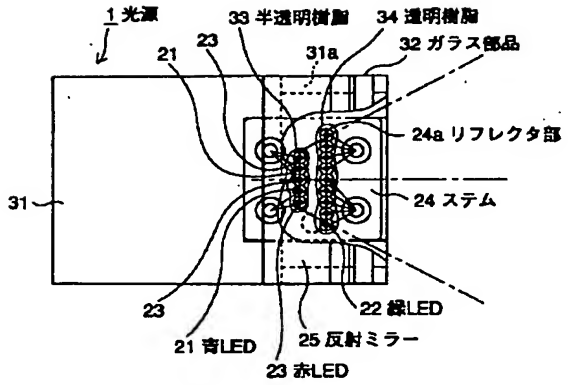
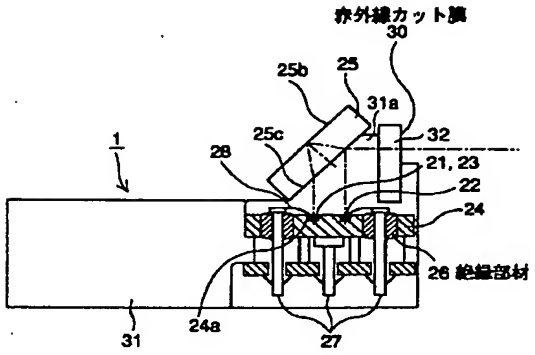


【図２】



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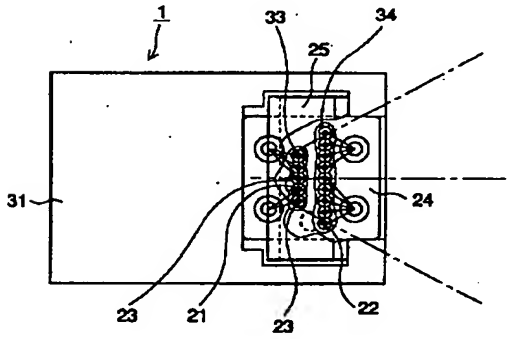

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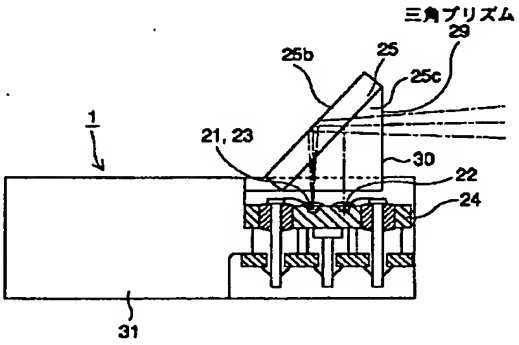

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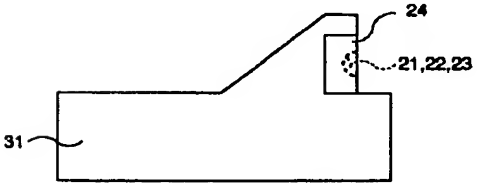
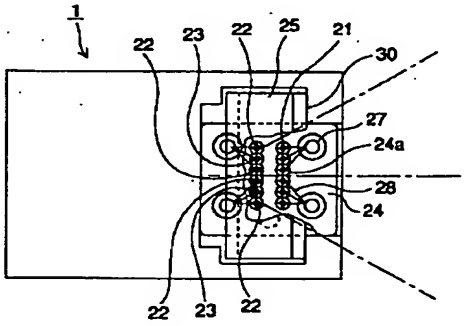
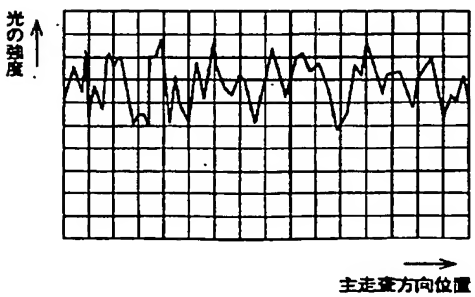


【図１１】



【図１３】



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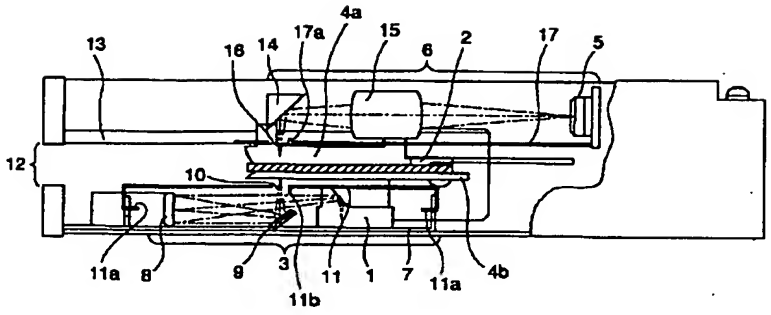
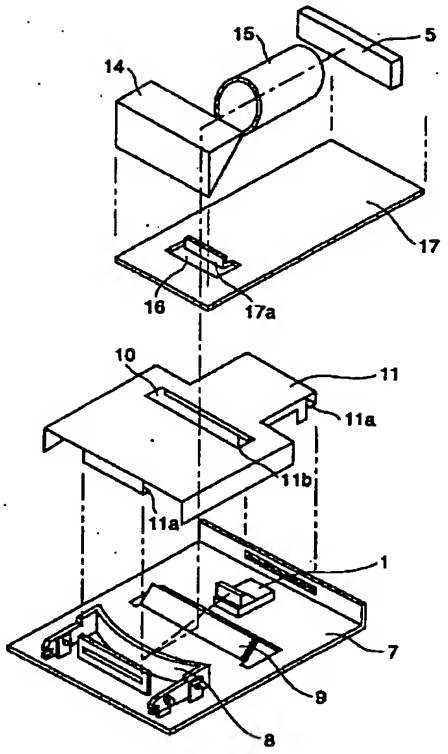
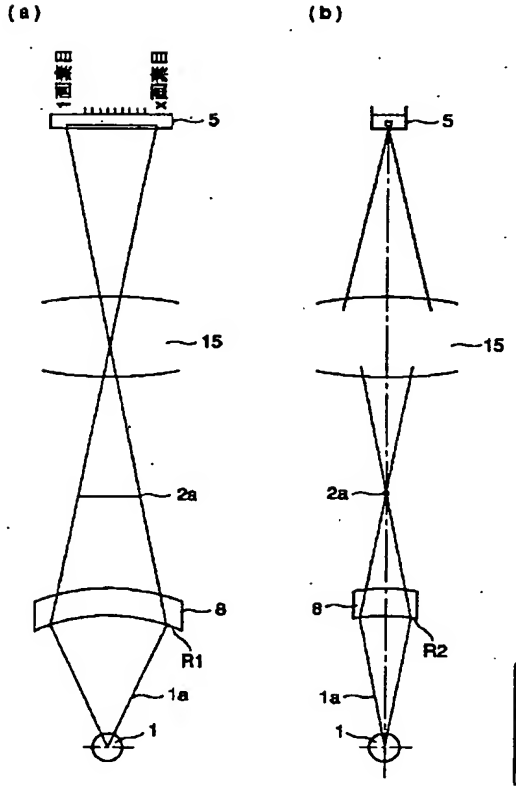

13
16
14
17a
4a
15
6
2
17
5
12
10
11a
8
9
3
11b
11
1
7
11a
4b

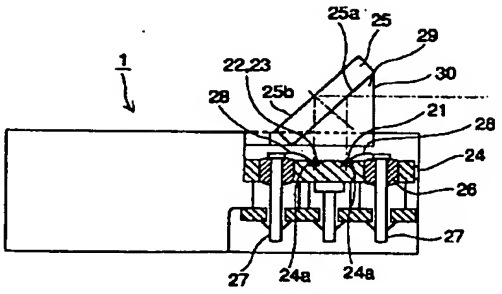
【図９】


15
5
14
17
16
17a
10
11
11a
11b
11a
1
7
9
8

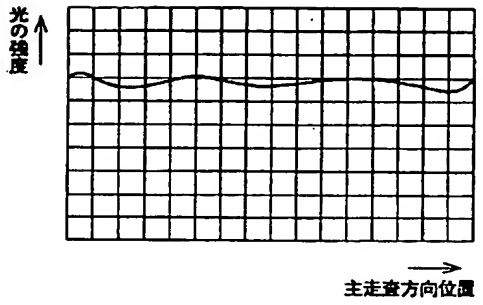
【図１０】


(a)
(b)
1画素目
x画素目
5
15
2a
8
R1
1a
1
5
15
2a
8
R2
1a
1

【図１２】


1
25a
25
29
22,23
30
28
25b
21
28
24
26
27
27
24a
24a

【図14】



フロントページの続き

(51)Int.Cl.⁶	識別記号	庁内整理番号	FI	技術表示箇所
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(71)Applicant : NIKON CORP

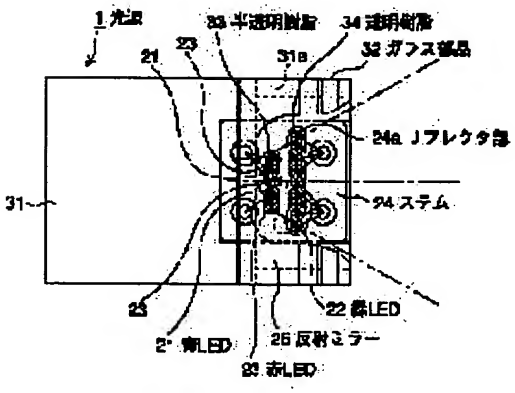
(72)Inventor : FUJINAWA NOBUHIRO
AIKAWA TOSHIYA

(54) IMAGE INPUT DEVICE AND LIGHT EMITTING DEVICE

(57)Abstract:

PURPOSE: To secure the light quantity of illumination light and to make illumination waveforms uniform simultaneously by sealing the light emitting surface of a light emitting element by a transparent resin material provided with a different light diffusion property corresponding to the position and light quantity of light emitted by the light emitting element.

CONSTITUTION: The light emitting surfaces of a red LED 23 and a blue LED 21 whose emitted light quantity per piece is large are sealed by translucent resin 33 provided with a diffusion property. Thus, the illumination waveforms are approximately uniformized. At the time, since the light quantity per piece is large for the red LED 23 and the blue LED 21, by expecting the reduction portion of the light quantity by diffusion and adjusting the number of pieces and a driving current value, the required light quantity is secured. In the meantime, for a green LED 22 whose emitted light quantity per piece is less, by increasing the number of the pieces, the light quantity is increased and the illumination waveforms are made uniform. Then, the light emitting surface of the green LED 22 is sealed by the transparent resin 34. Thus, the reduction of the light quantity by a sealing material is prevented.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

* NOTICES *

1. This document has been translated by computer.So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The picture input device characterized by closing with the transparent sealing agent which has optical diffusibility which is different in the luminescence side of the aforementioned light emitting device, respectively in the picture input device which irradiates the light emitted from the light emitting device of a color at the picture of a manuscript, and changes the light from the aforementioned manuscript into an electrical signal by the photo detector. [two or more]
[Claim 2] The optical diffusibility of the aforementioned transparent sealing agent is a picture input device according to claim 1 characterized by changing with quantity of lights of the light which the aforementioned light emitting device of each color emits.
[Claim 3] The optical diffusibility of the aforementioned transparent sealing agent is a picture input device according to claim 1 characterized by changing with positions of the aforementioned light emitting device of each color.
[Claim 4] Luminescence equipment which emits the light of the 1st color and the 2nd different color from the 1st color of the above to the aforementioned manuscript in order to read the picture of a manuscript characterized by providing the following by the optoelectric transducer. The 1st light emitting device which is arranged on a stem and emits light in the 1st color of the above. The 2nd light emitting device which is arranged by the 1st light emitting device of the above, and parallel on the aforementioned stem, and emits light in the 2nd color of the above. The 1st transparence sealing agent which has the 1st diffusibility which closes the 1st light emitting device of the above. The 2nd transparence sealing agent which has the 2nd different diffusibility from the 1st diffusibility of the above which closes the 2nd light emitting device of the above.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention relates to the luminescence equipment used for the picture input device and it which input the picture of a manuscript and are changed into an electrical signal, and relates to a picture input device and light equipment compatible in reservation of the quantity of light of the light especially emitted from the light source, and equalization of a lighting wave.
[0002]
[Description of the Prior Art] The composition of an example of the conventional picture input device is shown in drawing 8 or drawing 12 . In drawing 8 and drawing 9 , the picture input device consists of the lighting section 3 which draws the lighting light emitted from the light source 1 on a manuscript 2, carriage 4 which holds a manuscript 2 and moves, and the projection section 6 which carries out image formation of the transmitted light which penetrates a manuscript 2 on the line sensor (CCD) 5 which is an image pck-up element.
[0003] the lighting section 3 — the base of a tabular — the light source 1 which emits light, and the sense of light are changed into a radial, and it has come to attach the 1st mirror 8 and the 2nd mirror 9 it is made to become a line on a manuscript side on a member 7 furthermore, the light source 1, the 1st mirror 8, and the 2nd mirror 9 — a wrap — the lighting section covering device material 11 which has the slit 10 which lighting light penetrates while being arranged like — the base — it is being fixed to the member 7 by presser-foot-stitch-tongue-like rack section 11a It is condensed so that it may become a line on a manuscript side by the 1st mirror 8, and the light emitted from the light source 1 is bent by the 2nd mirror 9 in the direction of a manuscript, i.e., a perpendicular direction.
[0004] Therefore, the light from the 2nd mirror 9 serves as a configuration of a long and slender abbreviation rectangle in the neighborhood which passes the slit 10 of the covering device material 11. Since the slit 10 prepared in the covering device material 11 should just have a size required for lighting light to pass, it is the shape of a rectangle of a little larger grade than the configuration of light. moreover, board 11b bends a part of slit 10 inside — having — **** — the base — the outdoor daylight from the opening 12 prepared in the front face of a member 7 has prevented reaching the light source 1 through a slit 10
[0005] The toric mirror is used as the 1st mirror 8. The curved surface R1 which has the 1st curvature of an parallel direction to manuscript side 2a as shown in drawing 10 , and the curved surface R2 which has the 2nd curvature of a right-angled direction to manuscript side 2a are compounded, and the toric mirror 8 is formed. And it is made to illuminate the width of face for reading RI of one line for optical 1a emitted by the curved surface R1 from the light source 1 in the position of manuscript side 2a, and image formation of the light source image of the light source 1 is carried out on manuscript side 2a by the curved surface R2.
[0006] Upper carriage 4a held on both sides of a manuscript 2 and lower carriage 4b are guided at two guide bars 13 arranged in parallel, and are movable to a longitudinal direction. The rack section which is not illustrated is prepared in a part of upper carriage 4a, and carriage 4 moves to right and left by the pinion driven with this, the stepping motor which is not illustrated.
[0007] The projection section 6 consists of the 3rd mirror 14, a lens 15, CCD5, and projection section covering device material 17 in which the slit 16 to which the manuscript transmitted light passes the whole simultaneously with a wrap was formed. Moreover, like [the slit 16 of the projection section covering device material 17] the lighting section covering device material 11, board 17a is bent inside and the outdoor daylight from opening 12 has prevented invading inside the direct projection section 6 through a slit 16. Moreover, a front face is black and lusterless processing is made so that the lighting section covering device material 11 and the projection section covering device material 17 may not reflect outdoor daylight in itself. And it reflects by the 3rd mirror 14 and image formation of the drawing information on the manuscript 2 illuminated by the lighting section 3 is carried out to CCD5 with a lens 15.
[0008] The composition of the light source 1 is shown in drawing 11 and drawing 12 . The light source 1 has Light Emitting Diode22 of the green (G) of 21 or 4 Light Emitting Diodes of the blue (B) as six light emitting devices, and two red's (R)'s Light Emitting Diode23, and each Light Emitting Diodes 21, 22, and 23 are mounted in the stem 24. Moreover, Light Emitting Diode21 of six blue is arranged on a straight line, and green Light Emitting Diode22 and green and red Light Emitting Diode23 are arranged in order of GRGGRG on the parallel straight line. And it emits from each Light Emitting Diodes 21, 22, and 23, and the optical axis of light reflected by both sides of the reflective mirror 25 prepared in the light source 1 is located in a coplanar.
[0009] 12 Light Emitting Diodes 21, 22, and 23 are mounted in the stem 24 formed in the tabular with a conductive

material, and one pole of each Light Emitting Diodes 21, 22, and 23 is connected to the stem 24. Moreover, the other poles of each Light Emitting Diodes 21, 22, and 23 are connected to the electrode 27 with which the stem 24 was equipped through insulating member 26, respectively through the wire 28. Furthermore, cone-like reflector section 24a which reflects luminescence to a longitudinal direction and is injected upwards is formed in the stem 24 around each Light Emitting Diodes 21, 22, and 23. It reflects by the reflective mirror 25 and the light reflected by each reflector section 24a is injected to the front, and it is condensed so that it may become a line on a manuscript 2 by mirrors 8 and 9 further.

[0010] At this time, the light which reflected the light emitted from blue Light Emitting Diode21 by blue reflective film 25a formed in the 1st page of the reflective mirror 25, and was emitted from green Light Emitting Diode22 and red Light Emitting Diode23 is reflected by total reflection film 25b formed in the 2nd page of the reflective mirror 25. Consequently, when it sees from the front of the light source 1, it seems that three colors are emitting light from the same position. Moreover, a manuscript 2 can be read at high speed by controlling the change of three colors of blue, green, and red electrically. In addition, the sign 29 shown in drawing 12 is the 45-degree prism formed in the Idemitsu side of the reflective mirror 25, and the infrared cut film 30 is formed in the Idemitsu side of prism 29 45 degrees.

[0011]

[Problem(s) to be Solved by the Invention] The lighting wave when generally illuminating the long and slender range on a manuscript side from one Light Emitting Diode chip has fine strength in the luminous-intensity distribution of main scanning direction, as shown in drawing 13 , and it is an uneven wave. Consequently, the so-called lighting nonuniformity might become large, or the narrow stripe might appear on the read picture.

[0012] If the number of Light Emitting Diodes is increased and the light is simultaneously switched on, in order to solve this problem, in order that the light emitted from each Light Emitting Diode may pile up, as shown in drawing 14 , a wave is offset suitably and the lighting light on a final manuscript side becomes almost uniform. Therefore, by increasing the number of Light Emitting Diodes about every color of red, green, and blue, lighting nonuniformity can be made small and can be illuminated uniformly.

[0013] However, since the number of Light Emitting Diodes which can be carried on a stem 24 in fact has a limit, many Light Emitting Diodes can be carried about no colors. Usually, since the quantity of light per Light Emitting Diode arranges many blue Light Emitting Diodes21 in consideration of the balance of the quantity of light in the conventional example shown in Light Emitting Diode of a few color, for example, drawing 11 , the number of Light Emitting Diode22 of a bright color, for example, green Light Emitting Diode, and red Light Emitting Diodes23 cannot be made [many], but a problem which was mentioned above is produced. Moreover, it causes cost quantity and is not desirable to increase the number of Light Emitting Diodes easily.

[0014] On the other hand, if optical diffusibility is given to the optic of the light source 1 or the other illumination system, it will become possible to make the wave of lighting light uniform. However, in order to make it spread about the light of all colors in this case, the quantity of light decreases synthetically and there is a problem that reading speed becomes slow. Especially about Light Emitting Diode of a color with little quantity of light per piece, a number is increased, the quantity of light is made [many], and a wave will also make what is uniform diffused purposely, and will become composition with much futility.

[0015] It is desirable, even if it drops the quantity of light somewhat about Light Emitting Diode of a color with much quantity of light per piece, equalizing lighting light by diffusion increases the number of Light Emitting Diode about a color with little [conversely] quantity of light, and it attains increase in the quantity of light, and wave-like equalization, and do not make it that is, more desirable to be spread. However, when lighting nonuniformity and the stripe occurred when it was going to secure the quantity of light, without being spread, since these were simultaneously unrealizable conventionally, and it was spread conversely and wave-like equalization was attained, the synthetic quantity of light fell, and there was a problem that reading speed became slow.

[0016] this invention was made in view of such a situation, and aims at offering a picture input device and luminescence equipment compatible in reservation of the quantity of light of lighting light, and equalization of a lighting wave.

[0017]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, a picture input device according to claim 1 The light emitted from the light emitting device (for example, Light Emitting Diodes 21, 22, and 23 of drawing 1) of a color is irradiated at the picture of a manuscript (for example, manuscript 2 of drawing 8). [two or more] In the picture input device which changes the light from a manuscript 2 into an electrical signal by the photo detector (for example, CCD5 of drawing 8), it is characterized by closing with the transparent sealing agent (for example, the transparent resin 34 of drawing 1 , the translucent resin 33) which has optical diffusibility which is different in the luminescence side of Light Emitting Diodes 21, 22, and 23, respectively.

[0018] A picture input device according to claim 2 is characterized by the optical diffusibility of the transparent sealing agents 33 and 34 changing with quantity of lights of the light which Light Emitting Diodes 21, 22, and 23 of each color emit.

[0019] A picture input device according to claim 3 is characterized by the optical diffusibility of the transparent sealing agents 33 and 34 changing with positions of Light Emitting Diodes 21, 22, and 23 of each color.

[0020] In order to read a manuscript 2 by the optoelectric transducer (for example, CCD5 of drawing 8), luminescence equipment according to claim 4 In the luminescence equipment (for example, light source 1 of drawing 1) which emits the light of the 1st color (for example, green of drawing 1), and the 2nd different color (for example,

blue of drawing 1 , red) from green to a manuscript 2 The 1st light emitting device which is arranged on a stem 24 and emits light in a green light (for example, Light Emitting Diode22 of drawing 1). The 2nd light emitting device which is arranged in parallel with Light Emitting Diode22 on a stem 24, and emits light in the light of blue and red (for example, Light Emitting Diodes 21 and 23 of drawing 1), It is characterized by having the 1st transparence sealing agent (for example, transparent resin 34 of drawing 1) which has the 1st diffusibility which closes Light Emitting Diode22, and the 2nd transparence sealing agent (for example, translucent resin 33 of drawing 1) which has the 2nd different diffusibility from the 1st diffusibility which closes Light Emitting Diodes 21 and 23.
[0021]
[Function] A lighting wave can be mostly made into homogeneity by closing the luminescence side of Light Emitting Diode23 of red with much quantity of light to which per piece emits light, and blue Light Emitting Diode21 in a picture input device given in claims 1 and 2 by the translucent resin 33 which has diffusibility. Since red Light Emitting Diode23 and blue Light Emitting Diode21 have much quantity of light per piece at this time, the required quantity of light is securable by foreseeing the decrement of the quantity of light by diffusion, and adjusting the number and drive current value.
[0022] On the other hand, green Light Emitting Diode22 with little quantity of light to which per piece emits light can attain increase in the quantity of light, and equalization of a lighting wave by making [many] the number. Since the luminescence side of green Light Emitting Diode22 is closed by the transparent resin 34 at this time, reduction of the quantity of light by the encapsulant can be prevented.
[0023] The quantity of light to which the light emitted from Light Emitting Diode of central approach among Light Emitting Diodes arranged on the straight line in a picture input device according to claim 3 reaches CCD5 Since there is comparatively more light emitted from surrounding Light Emitting Diode than the quantity of light which reaches CCD5, equalization of a quantity of light distribution can be attained by closing Light Emitting Diode of central approach by the large translucent resin 33 of optical diffusibility, and closing surrounding Light Emitting Diode by the small transparent resin 34 of optical diffusibility also with the same color.
[0024] In luminescence equipment according to claim 4, by considering as the same composition as the light source 1 used for the picture input device according to claim 1, the same operation and the same effect can be acquired and reservation of the quantity of light of the lighting light of luminescence equipment and equalization of a lighting wave can be reconciled.
[0025]
[Example] Hereafter, one example of the picture input device of this invention and luminescence equipment is explained with reference to a drawing.
[0026] The composition of the 1st example of this invention is shown in drawing 1 or drawing 3 . In these drawings, the same sign is given to the portion of the conventional example shown in drawing 11 and drawing 12 , and the corresponding portion, and the explanation is omitted suitably. The composition of other portions of the picture input device which has the feature of this example in the composition of the light source 1 which is luminescence equipment, and is equipped with the light source 1 is the same as that of the conventional example shown in drawing 8 and drawing 9 . In addition, although the conventional example explained the case where there was least quantity of light of blue Light Emitting Diode21, this example explains as what has the fewest quantity of light of green Light Emitting Diode22.
[0027] In drawing 1 or drawing 3 , on the stem 24 in the light source 1, two or more reflector section 24a to which bonding of the Light Emitting Diode chip is carried out is formed at two trains, and Light Emitting Diode23 of red with comparatively much quantity of light (R) and blue (B) Light Emitting Diode21 are arranged in order of RBRBR at one of the two's train. Light Emitting Diode22 of green with least quantity of light (G) is arranged two or more among 3 colors at the nine-piece single tier at another train.
[0028] the base of a portion where the stem 24 has been arranged — triangle-like mirror supporter 31a is formed in the both sides of a member 31 at one The slant face of mirror supporter 31a serves as an angle of 45 degrees to the upper surface of a stem 24, and adhesion fixation of the ends of the reflective mirror 25 is carried out on this slant face. It consists of monotonous glass with both sides parallel [the reflective mirror 25], green reflective film 25c is formed in an inside field, and total reflection film 25b is formed in the outside field. The light emitted from green Light Emitting Diode22 by this composition is reflected by green reflective film 25c, and it is refracted on the front face of green reflective film 25c, enters in the reflective mirror 25, and reflects by total reflection film 25b of an outside field, and the light emitted from red Light Emitting Diode23 and blue Light Emitting Diode21 is again refracted in respect of green reflective film 25c, and is injected. Consequently, when the optical axis of the train of red/blue and a green train is in agreement and it sees from the front of the light source 1 like the case of the conventional example, it seems that three colors are emitting light from the same position.
[0029] Moreover, the light source base 31 is fixed in the right-angled direction to the optical axis of outgoing radiation light, and the glass parts 32 with which the infrared cut film 30 was formed have cut into the front face of the direction of outgoing radiation of the light source 1 only the infrared component contained in a luminescence component. Since the lighting light led to up to a manuscript side becomes only a part for visible Mitsunari by this and an infrared component is not contained, an exact color reproduction becomes possible.
[0030] After bonding of Light Emitting Diodes 21, 22, and 23 is carried out to reflector section 24a in a stem 24, they are closed by resins, such as silicon, for protection against dust and fixation. At this time, it is closing using the translucent resin 33 which has diffusibility in the train of red Light Emitting Diode23 and blue Light Emitting Diode21, and is closing using the transparent resin 34 without diffusibility in the train of green Light Emitting Diode22.

[0031] According to the above-mentioned composition, the light emitted from red Light Emitting Diode23 and blue Light Emitting Diode21 is diffused with the translucent resin 33 immediately after coming out of Light Emitting Diodes 23 and 21, and can attain equalization of a lighting wave. Although the quantity of light is reduced for diffusion at this time, since red Light Emitting Diode23 and blue Light Emitting Diode21 have much quantity of light per piece, it can respond by foreseeing the part to which the quantity of light decreases by diffusion, and adjusting the number and drive current value.
[0032] Since green Light Emitting Diode22 is closed by the usual transparent resin 34 on the other hand and it is not spread, the quantity of light does not fall off. Moreover, since Light Emitting Diode22 has many nine pieces and numbers, a lighting wave is offset and it serves as a flat lighting light.
[0033] That is, although there is a margin in the quantity of light, there is little number, and lighting light can diffuse alternatively only the light emitted from Light Emitting Diode23 of the red who becomes a wave, and blue Light Emitting Diode21, can make [many] the number about green Light Emitting Diode22 with little quantity of light, and can attain increase in the quantity of light, and equalization of a lighting wave. Consequently, as compared with the case where you do not make it spread, a flat wave with little lighting nonuniformity can be acquired. Moreover, if it compares with the case where all light is diffused by the diffusion means, since diffusion useless about Light Emitting Diode of a color with little quantity of light will not be performed, the comprehensive quantity of light is not reduced.
[0034] according to this example — three colors — a simultaneously — since the lighting light to which it has a uniform luminous-intensity distribution, and the quantity of light was also secured can be obtained, it becomes possible to read a picture with high quality and at high speed
[0035] The composition of the 2nd example of this invention is shown in drawing 4 and drawing 5 . Like the conventional example shown in drawing 11 and drawing 12 , it is the case where the reflective mirror 25 is joined to the triangular prism 29, and this example is the same as that of the structure of the above-mentioned example, and the effect of this example of the closure structure by the transparent sealing agent of Light Emitting Diodes 21, 22, and 23 is also the same.
[0036] Although each above-mentioned example explained the case where Light Emitting Diodes 21, 22, and 23 had been arranged in two trains, as shown in drawing 6 , you may arrange in one train. It may arrange in order of this time, for example, G, G, B, R, B, G, and G, green (G) Light Emitting Diode22 may be closed by the transparent resin 34, and red (R) Light Emitting Diode23 and blue Light Emitting Diode21 may be closed by the translucent resin 33. this — the time — a center — Light Emitting Diode — (— R —) — 23 — from — emitting — light — CCD — five — reaching — the quantity of light — the circumference — Light Emitting Diode — (— B —) — 21 — and — Light Emitting Diode — (— G —) — 22 — from — emitting — light — CCD — five — reaching — the quantity of light — many — since — a center — Light Emitting Diode — (— R —) — 23 — closing — translucent — a resin — 33 — diffusibility
[0037] Moreover, as shown in drawing 7 , a stem 24 may be arranged perpendicularly on the light source base 31, to the front face of a stem 24, as shown in drawing 6 , Light Emitting Diodes 21, 22, and 23 may be arranged in one train, and the reflective mirror 25 may be omitted.
[0038] Although green Light Emitting Diode22 explained the case where there was least quantity of light, in each above-mentioned example When it is not limited to this and the light source of two or more colors is used, this invention It cannot be overemphasized that the same effect is acquired by diffusing alternatively the light which acts as Idemitsu of the light emitted from Light Emitting Diode of a color with little quantity of light through the transparent resin 34 without diffusibility, and is emitted from Light Emitting Diode of a color with much quantity of light by the translucent resin 33 of diffusibility. Moreover, according to the quantity of light of Light Emitting Diode, you may prepare a difference in the diffusibility of a resin.
[0039]
[Effect of the Invention] Since it closed with the transparent sealing agent which has different optical diffusibility according to the quantity of light and the position of light where a light emitting device emits the luminescence side of a light emitting device according to the picture input device and luminescence equipment of this invention as explained above, reservation of the quantity of light of lighting light and equalization of a lighting wave can be attained simultaneously.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] the composition of the light source as luminescence equipment by the 1st example of the picture input device of this invention is shown — it is a fracture plan in part
[Drawing 2] It is drawing of longitudinal section of drawing 1 .
[Drawing 3] It is the enlarged vertical longitudinal sectional view showing the composition of the Light Emitting Diode section of drawing 2 .
[Drawing 4] the composition of the light source by the 2nd example of this invention is shown — it is a fracture plan in part
[Drawing 5] It is drawing of longitudinal section of drawing 4 .
[Drawing 6] It is the plan showing arrangement of Light Emitting Diode by other examples of this invention.
[Drawing 7] It is the side elevation showing the composition of the light source by other examples of this invention.
[Drawing 8] the composition of an example of the conventional picture input device is shown — it is a fracture side elevation in part
[Drawing 9] It is the decomposition perspective diagram showing the composition of the lighting section of drawing 8 , and the projection section.
[Drawing 10] It is shown explanatory drawing showing the optical system of drawing 9 .
[Drawing 11] the composition of the light source of drawing 8 is shown — it is a fracture plan in part
[Drawing 12] It is drawing of longitudinal section of drawing 11 .
[Drawing 13] It is the diagram showing an example of the lighting wave of one Light Emitting Diode when not making it spread.
[Drawing 14] It is the diagram showing an example of the equalized lighting wave.
[Description of Notations]
1 Light Source (Luminescence Equipment)
2 Manuscript
5 CCD (Photo Detector)
21, 22, 23 Light Emitting Diode (light emitting device)
33 Translucent Resin (Transparent Sealing Agent)
34 Transparent Resin (Transparent Sealing Agent)

[Translation done.]

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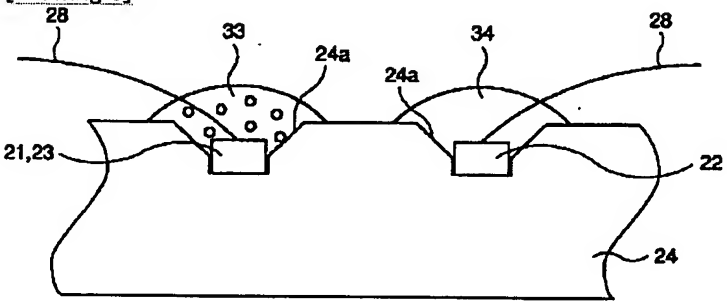
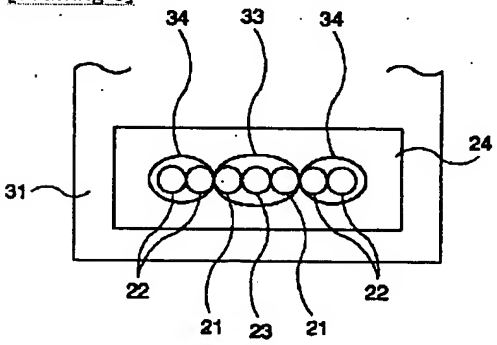
DRAWINGS

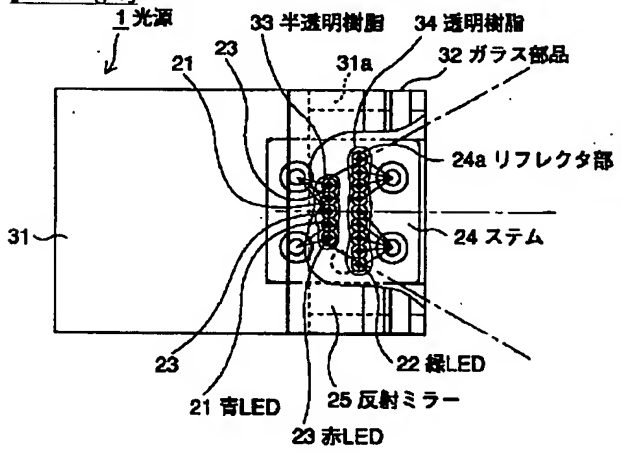
[Drawing 3]



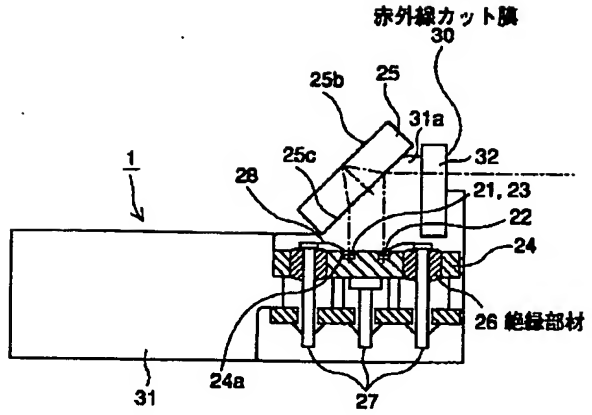
[Drawing 6]



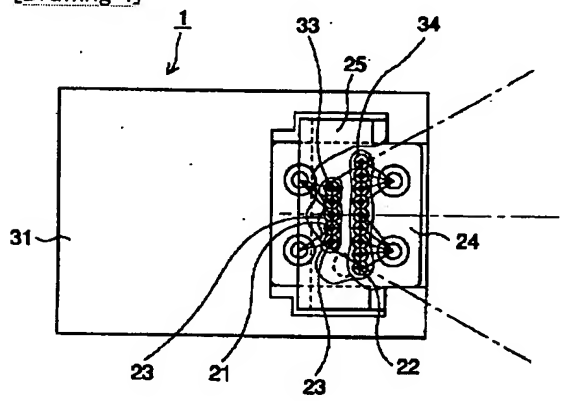
[Drawing 1]



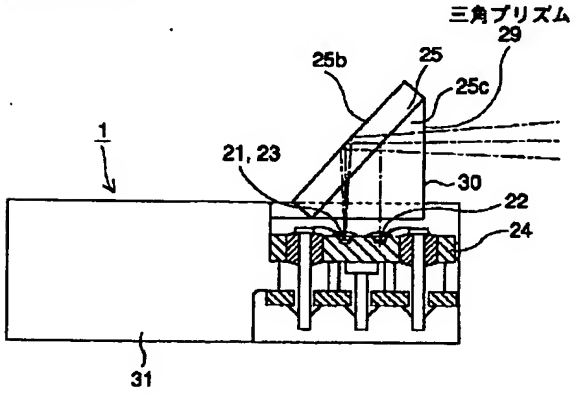
[Drawing 2]



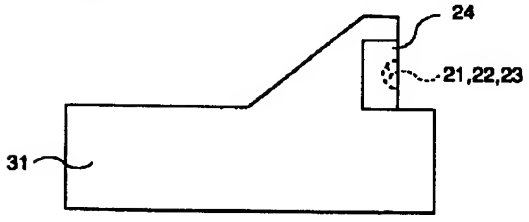
[Drawing 4]



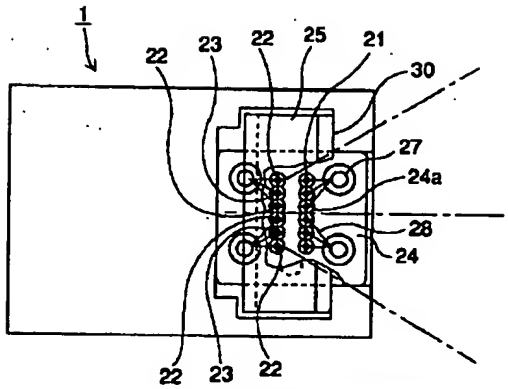
[Drawing 5]



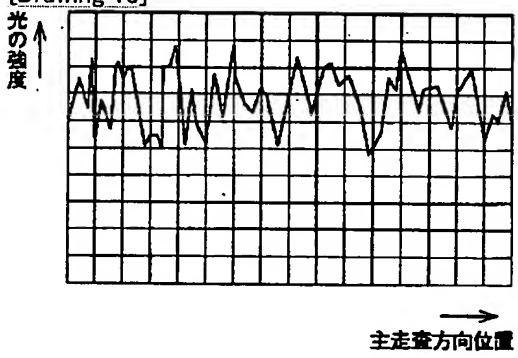
[Drawing 7]



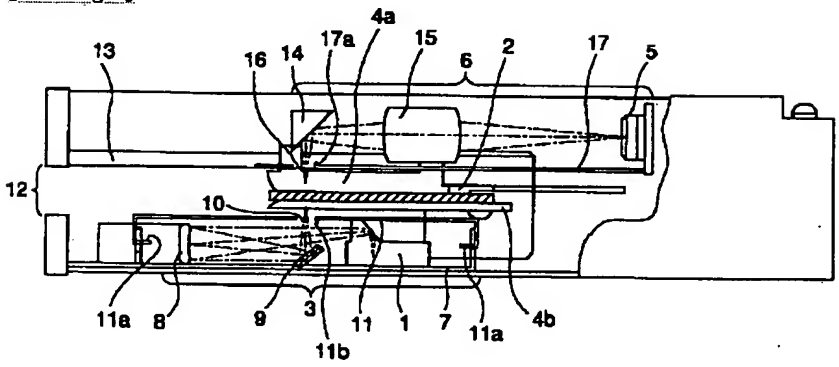
[Drawing 11]



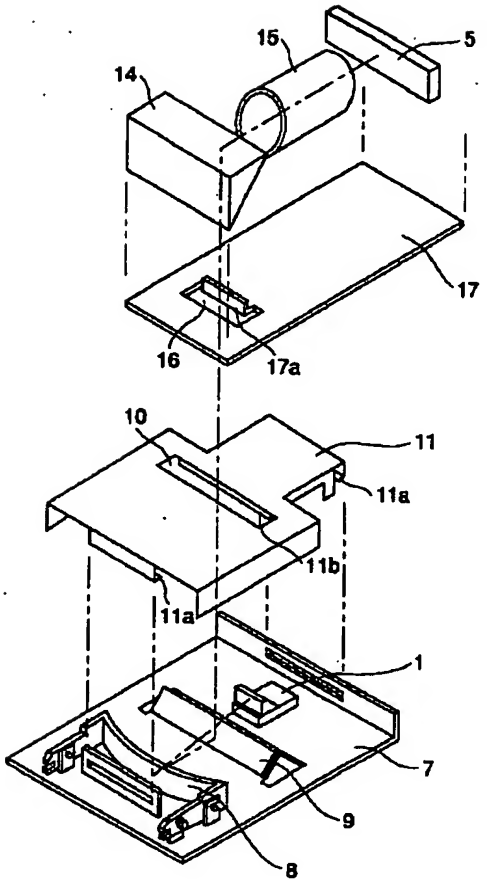
[Drawing 13]



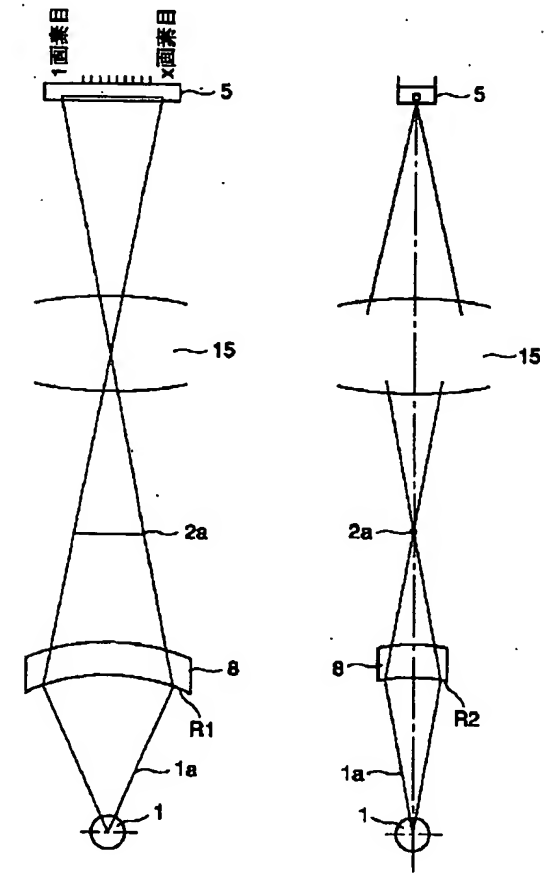
[Drawing 8]



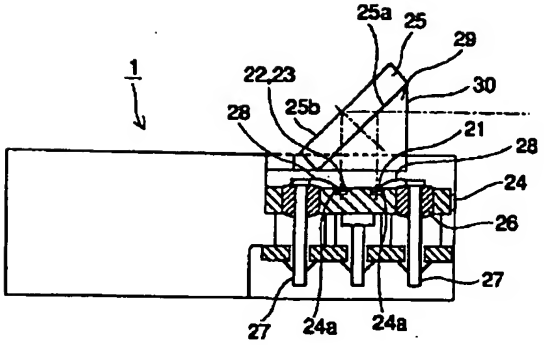
[Drawing 9]



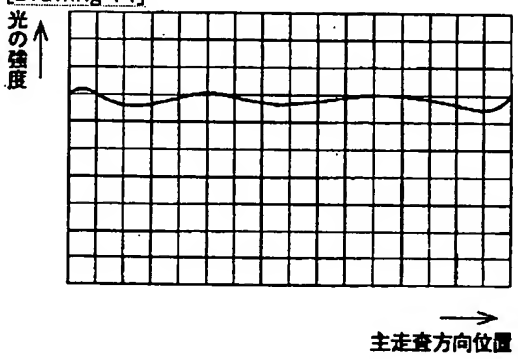
[Drawing 10]



[Drawing 12]



[Drawing 14]



[Translation done.]